

THE CLAIMS:

Please AMEND the claim and ADD new claims as follows:

1. (CURRENTLY AMENDED) An optical transmission system comprising:
  - an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths;
  - a multi-stage optical amplifier amplifying the WDM optical signal received from the optical transmitter ~~with substantially equal gain with respect to the wavelengths of the plurality of the optical signals independently of variation of the received WDM optical signal level and outputting the amplified WDM optical signal~~; and
  - an optical receiver receiving the amplified WDM optical signal output from said multi-stage optical amplifier,
    - said multi-stage optical amplifier including
      - an optical coupler splitting the received WDM optical signal into a monitor optical signal and a transmission WDM optical signal,
      - a first-stage optical amplifier which amplifies the ~~received transmission~~ WDM optical signal,
      - a level controller which controls a power level of the transmission WDM optical signal amplified by the first-stage optical amplifier, and
      - a second-stage optical amplifier which amplifies the transmission WDM optical signal of which level is controlled by the level controller.

2. (CURRENTLY AMENDED) An optical transmission system comprising:
  - a first optical transmission line through which a WDM optical signal including a plurality of optical signals with different wavelengths is transmitted;
  - a multi-stage optical amplifier to amplify the WDM optical signal received from the first optical transmission line ~~with substantially equal gain over the wavelengths of the optical signals independently of variation of the received WDM optical signal level~~; and
  - a second optical transmission line through which the amplified WDM optical signal is transmitted, wherein the multi-stage optical amplifier includes
    - an optical coupler splitting the received WDM optical signal into a monitor optical signal and a transmission WDM optical signal,
    - a front-stage optical amplifier which amplifies the transmission WDM optical signal to produce a front-stage amplified WDM optical signal,

a level controller which controls a power level of the front-stage amplified WDM optical signal and outputs a controlled WDM optical signal, and

a rear-stage optical amplifier which amplifies the controlled WDM optical signal to output a rear-stage amplified WDM optical signal.

3. (CURRENTLY AMENDED) An optical transmission system comprising:

an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths;

a multi-stage optical amplifier receiving the transmitted WDM optical signal and amplifying to amplify the received WDM optical signal from the optical transmitter with substantially equal gain, over the wavelengths of the optical signals and time, and to output the amplified WDM optical signal; and

an optical receiver receiving the amplified WDM optical signal output from the multi-stage optical amplifier, wherein the multi-stage optical amplifier includes

an optical coupler splitting a WDM optical monitor signal off from the received WDM optical signal, to thereby provide a WDM optical signal and a WDM optical monitor signal,

a first-stage optical amplifier which amplifies the WDM optical signal provided by the coupler,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller.

4. (CURRENTLY AMENDED) An optical transmission system comprising:

an optical transmitter transmitting a WDM optical signal including a plurality of optical signals with different wavelengths through a first optical transmission line;

a multi-stage optical amplifier amplifying the WDM optical signal received from the first optical transmission line ~~with substantially equal gain, with respect to the wavelengths of the plurality of the optical signals and time, and outputting the amplified WDM optical signal,~~ the multi-stage optical amplifier including

a coupler splitting a WDM optical monitor signal off from the received WDM optical signal, to thereby provide a WDM optical signal and a WDM optical monitor signal,

a first-stage optical amplifier which amplifies the received WDM optical signal provided by the coupler,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller; and

an optical receiver receiving the amplified WDM optical signal through a second optical transmission line through.

5. (CANCELED)

6. (CANCELED)

7. (CANCELED)

8. (CURRENTLY AMENDED) An optical transmission system according to claim 1, wherein the level controller includes a variable optical attenuator which variably attenuates the transmission WDM optical signal amplified by the first-stage optical amplifier and thereby controls the power level of the amplified WDM optical signal.

9. (PREVIOUSLY PRESENTED) An optical transmission system according to claim 2, wherein the level controller includes a variable optical attenuator which variably attenuates the front-stage amplified WDM optical signal and thereby controls the power level of the amplified WDM optical signal.

10. (PREVIOUSLY PRESENTED) An optical transmission system according to claim 3, wherein the level controller includes a variable optical attenuator which variably attenuates the WDM optical signal amplified by the first-stage optical amplifier and thereby controls the power level of the amplified WDM optical signal.

11. (PREVIOUSLY PRESENTED) An optical transmission system according to claim 4, wherein the level controller includes a variable optical attenuator which variably attenuates the WDM optical signal amplified by the first-stage optical amplifier and thereby controls the power level of the amplified WDM optical signal.

12. (CURRENTLY AMENDED) An apparatus comprising:

a multi-stage optical amplifier amplifying a WDM optical signal including a plurality of

optical signals with different wavelengths received from an optical transmitter ~~with substantially equal gain with respect to the wavelengths of the plurality of the optical signals independently of variation of the received WDM optical signal level~~ and outputting the amplified WDM optical signal, the multi-stage optical amplifier including

an optical coupler splitting a WDM optical monitor signal off from the received WDM optical signal, to thereby provide a WDM optical monitor signal and a WDM optical signal,

a first-stage optical amplifier which amplifies the received WDM optical signal provided by the optical coupler,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller.

13. (CURRENTLY AMENDED) An apparatus comprising:

a multi-stage optical amplifier to amplify a WDM optical signal including a plurality of optical signals with different wavelengths ~~with substantially equal gain over the wavelengths of the optical signals and time~~, the multi-stage optical amplifier including

an optical coupler splitting the WDM optical signal into a monitor WDM optical signal and a transmission WDM optical signal,

a front-stage optical amplifier which amplifies the transmission WDM optical signal to produce a front-stage amplified WDM optical signal,

a level controller which controls a power level of the front-stage amplified WDM optical signal and outputs a controlled WDM optical signal, and

a rear-stage optical amplifier which amplifies the controlled WDM optical signal to produce a rear-stage amplified WDM optical signal.

14. (CURRENTLY AMENDED) An apparatus comprising:

a multi-stage optical amplifier to amplify a WDM optical signal including a plurality of optical signals with different wavelengths from an optical transmitter ~~with substantially equal gain over the wavelengths of the optical signals and time~~, the multi-stage optical amplifier including

an optical coupler splitting the WDM optical signal into a monitor WDM optical signal and a transmission WDM optical signal,

a first-stage optical amplifier which amplifies the transmission WDM optical signal,

a level controller which controls a power level of the transmission WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the transmission WDM optical signal of which level is controlled by the level controller.

15. (CURRENTLY AMENDED) An apparatus comprising:

a multi-stage optical amplifier amplifying a WDM optical signal including a plurality of optical signals with different wavelengths received from an optical transmission line ~~with substantially equal gain with respect to the wavelengths of the plurality of the optical signals independently of variation of the received WDM optical signal level~~ and outputting the amplified WDM optical signal, the multi-stage optical amplifier including

an optical coupler splitting a WDM optical monitor signal off from the received WDM optical signal, to thereby provide a WDM optical monitor signal and a WDM optical signal,

a first-stage optical amplifier which amplifies the received WDM optical signal provided by the optical coupler,

a level controller which controls a power level of the WDM optical signal amplified by the first-stage optical amplifier, and

a second-stage optical amplifier which amplifies the WDM optical signal of which level is controlled by the level controller.

16. (PREVIOUSLY PRESENTED) An apparatus according to claim 12, wherein the level controller includes a variable optical attenuator which variably attenuates the WDM optical signal amplified by the first-stage optical amplifier and thereby controls the power level of the amplified WDM optical signal.

17. (PREVIOUSLY PRESENTED) An apparatus according to claim 13, wherein the level controller includes a variable optical attenuator which variably attenuates the front-stage amplified WDM optical signal and thereby controls the power level of the amplified WDM optical signal.

18. (PREVIOUSLY PRESENTED) An apparatus according to claim 14, wherein the level controller includes a variable optical attenuator which variably attenuates the WDM optical signal amplified by the first-stage optical amplifier and thereby controls the power level of the

amplified WDM optical signal.

19. (PREVIOUSLY PRESENTED) An apparatus according to claim 15, wherein the level controller includes a variable optical attenuator which variably attenuates the WDM optical signal amplified by the first-stage optical amplifier and thereby controls the power level of the amplified WDM optical signal.

20. (CURRENTLY AMENDED) An apparatus according to claim 12, wherein the multi-stage optical amplifier further comprises:

an input through which the WDM optical signal is received and coupled to the optical coupler~~first-stage optical amplifier~~, and

an output, coupled to the second-stage optical amplifier, from which the second-stage amplified WDM optical signal is output.

21. (CURRENTLY AMENDED) An apparatus according to claim 13, wherein the multi-stage optical amplifier further comprises:

an input through which the WDM optical signal is received and coupled to the ~~front-stage optical amplifier~~optical coupler, and

an output, coupled to the rear-stage optical amplifier, from which the rear-stage amplified WDM optical signal is output.

22. (CURRENTLY AMENDED) An apparatus according to claim 14, wherein the multi-stage optical amplifier further comprises:

an input through which the WDM optical signal is received and coupled to the ~~first-stage optical amplifier~~optical coupler, and

an output, coupled to the second-stage optical amplifier, from which the second-stage amplified WDM optical signal is output.

23. (CURRENTLY AMENDED) An apparatus according to claim 15, wherein the multi-stage optical amplifier further comprises:

an input through which the WDM optical signal is received and coupled to the ~~first-stage optical amplifier~~optical coupler, and

an output, coupled to the second-stage optical amplifier, from which the second-stage amplified WDM optical signal is output.

24. (PREVIOUSLY PRESENTED) An optical transmission system according to claim 1, wherein the multi-stage optical amplifier receives the WDM optical signal through an input of the multi-stage optical amplifier from a transmission line, and outputs the amplified WDM optical signal from an output of the multi-stage optical amplifier to the transmission line.

25. (PREVIOUSLY PRESENTED) An optical transmission system according to claim 3, wherein the multi-stage optical amplifier receives the WDM optical signal through an input of the multi-stage optical amplifier from a transmission line, and outputs the amplified WDM optical signal from an output of the multi-stage optical amplifier to the transmission line.

26. (PREVIOUSLY PRESENTED) An optical transmission system according to claim 4, wherein the multi-stage optical amplifier receives the WDM optical signal through an input of the multi-stage optical amplifier from the first optical transmission line, and outputs the amplified WDM optical signal from an output of the multi-stage optical amplifier to the second optical transmission line.

27. (PREVIOUSLY PRESENTED) An apparatus according to claim 20, wherein the multi-stage optical amplifier receives the WDM optical signal through the input from a transmission line, and outputs the amplified WDM optical signal from the output to the transmission line.

28. (PREVIOUSLY PRESENTED) An apparatus according to claim 21, wherein the multi-stage optical amplifier receives the WDM optical signal through the input from a transmission line, and outputs the amplified WDM optical signal from the output to the transmission line.

29. (PREVIOUSLY PRESENTED) An apparatus according to claim 22, wherein the multi-stage optical amplifier receives the WDM optical signal through the input from a transmission line, and outputs the amplified WDM optical signal from the output to the transmission line.

30. (PREVIOUSLY PRESENTED) An apparatus according to claim 23, wherein the multi-stage optical amplifier receives the WDM optical signal through the input from the optical

transmission line, and outputs the WDM optical signal after being amplified by the second-stage optical amplifier from the output to the optical transmission line.

31. (NEW) An optical transmission system according to claim 1, wherein the multi-stage optical amplifier further includes:

a detector detecting the monitor optical signal and outputting a monitor signal.

32. (NEW) An optical transmission system according to claim 31, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the first-stage optical amplifier in accordance with the monitor signal.

33. (NEW) An optical transmission system according to claim 2, wherein the multi-stage optical amplifier further includes:

a detector detecting the monitor optical signal and outputting a monitor signal.

34. (NEW) An optical transmission system according to claim 33, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the front-stage optical amplifier in accordance with the monitor signal.

35. (NEW) An optical transmission system according to claim 3, wherein the multi-stage optical amplifier further includes:

a detector detecting the WDM optical monitor signal and outputting a monitor signal.

36. (NEW) An optical transmission system according to claim 35, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the first-stage optical amplifier in accordance with the monitor signal.

37. (NEW) An optical transmission system according to claim 4, wherein the multi-stage optical amplifier further includes:

a detector detecting the WDM optical monitor signal and outputting a monitor

signal.

38. (NEW) An optical transmission system according to claim 37, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the first-stage optical amplifier in accordance with the monitor signal.

39. (NEW) An apparatus according to claim 12, wherein the multi-stage optical amplifier further includes:

a detector detecting the WDM optical monitor signal and outputting a monitor signal.

40. (NEW) An optical transmission system according to claim 39, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the first-stage optical amplifier in accordance with the monitor signal.

41. (NEW) An apparatus according to claim 13, wherein the multi-stage optical amplifier further includes:

a detector detecting the monitor WDM optical signal and outputting a monitor signal.

42. (NEW) An optical transmission system according to claim 41, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the front-stage optical amplifier in accordance with the monitor signal.

43. (NEW) An apparatus according to claim 14, wherein the multi-stage optical amplifier further includes:

a detector detecting the monitor WDM optical signal and outputting a monitor signal.

44. (NEW) An optical transmission system according to claim 43, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the first-stage optical amplifier in accordance with the monitor signal.

45. (NEW) An apparatus according to claim 15, wherein the multi-stage optical amplifier further includes:

a detector detecting the WDM optical monitor signal and outputting a monitor signal.

46. (NEW) An apparatus according to claim 45, wherein the multi-stage optical amplifier further includes:

a controller controlling gain of the first-stage optical amplifier in accordance with the monitor signal.